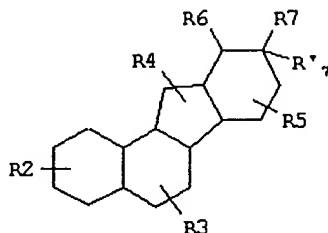


steroidal alkaloid having a structure represented in the general formula (I), or unsaturated forms thereof and/or nor- or homo-derivatives thereof:



Formula I

wherein, as valence permits,

R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub>, and R<sub>5</sub>, represent one or more substitutions to the ring to which each is attached, for each occurrence, independently represent hydrogen, halogens, alkyls, alkenyls, alkynyls, aryls, hydroxyl, =O, =S, alkoxyl, silyloxy, amino, nitro, thiol, amines, imines, amides, phosphoryls, phosphonates, phosphines, carbonyls, carboxyls, carboxamides, anhydrides, silyls, ethers, thioethers, alkylsulfonyls, arylsulfonyls, selenoethers, ketones, aldehydes, esters, or  $-(CH_2)_m-R_8$ ;

R<sub>6</sub>, R<sub>7</sub>, and R'<sub>7</sub>, independently for each occurrence, are absent or represent hydrogens, halogens, alkyls, alkenyls, alkynyls, aryls, hydroxyl, =O, =S, alkoxyl, silyloxy, amino, nitro, thiol, amines, imines, amides, phosphoryls, phosphonates, phosphines, carbonyls, carboxyls, carboxamides, anhydrides, silyls, ethers, thioethers, alkylsulfonyls, arylsulfonyls, selenoethers, ketones, aldehydes, esters, or  $-(CH_2)_m-R_8$ , or

R<sub>6</sub> and R<sub>7</sub>, or R<sub>7</sub> and R'<sub>7</sub>, taken together form a ring or polycyclic ring,

with the proviso that at least one of R<sub>6</sub>, R<sub>7</sub>, or R'<sub>7</sub> is present and includes a primary or secondary amine;

R<sub>8</sub> represents an aryl, a cycloalkyl, a cycloalkenyl, a heterocycle, or a polycycle; and m is an integer in the range 0 to 8 inclusive.

4. (Amended) The method of claim 3, wherein:

$R_2$  and  $R_3$ , for each occurrence, is an -OH, alkyl, -O-alkyl, -C(O)-alkyl, or -C(O)- $R_8$ ;

$R_4$ , for each occurrence represents H, -OH, =O, alkyl, -O-alkyl, -C(O)-alkyl, or -C(O)- $R_8$ ;

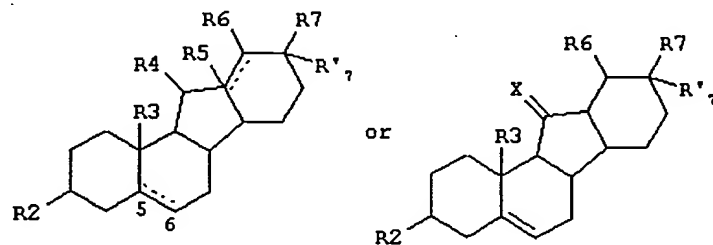
$R_6$ ,  $R_7$ , and  $R'_7$  each independently represent, hydrogen, alkyls, alkenyls, alkynyls, amines, imines, amides, carbonyls, carboxyls, carboxamides, ethers, thioethers, esters, or  $-(CH_2)_m-R_8$ , or

$R_7$ , and  $R'_7$  taken together form a furanopiperidine, such as perhydrofuro[3,2-b]pyridine, a pyranopiperidine, a quinoline, an indole, a pyranopyrrole, a naphthyridine, a thiofuranopiperidine, or a thiopyranopiperidine

with the proviso that at least one of  $R_6$ ,  $R_7$ , or  $R'_7$  is present and includes a primary or secondary amine;

$R_8$  represents an aryl, a cycloalkyl, a cycloalkenyl, a heterocycle, or a polycycle, and preferably  $R_8$  is a piperidine, pyrimidine, morpholine, thiomorpholine, pyridazine.

5. (Four Times Amended) A method for inhibiting activation of a *hedgehog-patched* pathway in a patient diagnosed with a hyperproliferative disorder, comprising administering to the patient a composition comprising a purified hedgehog antagonist in a sufficient amount to reduce the activation of the *hedgehog-patched* pathway in a cell of the patient, wherein the antagonist is a steroidal alkaloid having a structure represented in the general formula (II), or unsaturated forms thereof and/or nor- or homo-derivatives thereof:



Formula II

wherein, as valence permits,

R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub>, and R<sub>5</sub>, represent one or more substitutions to the ring to which each is attached, for each occurrence, independently represent hydrogen, halogens, alkyls, alkenyls, alkynyls, aryls, hydroxyl, =O, =S, alkoxy, silyloxy, amino, nitro, thiol, amines, imines, amides, phosphoryls, phosphonates, phosphines, carbonyls, carboxyls, carboxamides, anhydrides, silyls, ethers, thioethers, alkylsulfonyls, arylsulfonyls, selenoethers, ketones, aldehydes, esters, or -(CH<sub>2</sub>)<sub>m</sub>-R<sub>8</sub>;

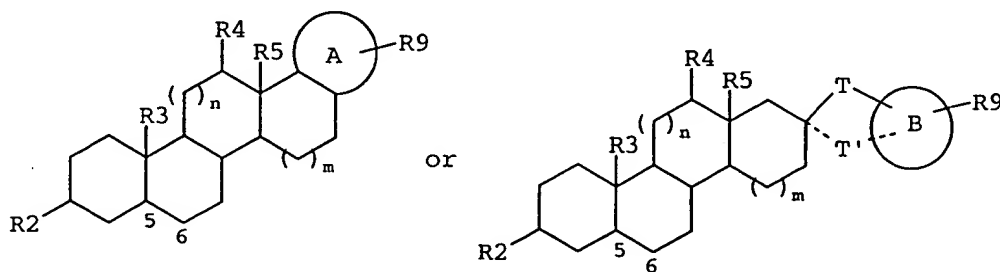
R<sub>6</sub>, R<sub>7</sub>, and R'<sub>7</sub>, are absent or represent, independently, halogens, alkyls, alkenyls, alkynyls, aryls, hydroxyl, =O, =S, alkoxy, silyloxy, amino, nitro, thiol, amines, imines, amides, phosphoryls, phosphonates, phosphines, carbonyls, carboxyls, carboxamides, anhydrides, silyls, ethers, thioethers, alkylsulfonyls, arylsulfonyls, selenoethers, ketones, aldehydes, esters, or -(CH<sub>2</sub>)<sub>m</sub>-R<sub>8</sub>, or

R<sub>6</sub> and R<sub>7</sub>, or R<sub>7</sub> and R'<sub>7</sub>, taken together form a ring or polycyclic ring, with the proviso that at least one of R<sub>6</sub>, R<sub>7</sub>, or R'<sub>7</sub> is present and includes a primary or secondary amine;

R<sub>8</sub> represents an aryl, a cycloalkyl, a cycloalkenyl, a heterocycle, or a polycycle; and m is an integer in the range 0 to 8 inclusive; and

X represents O or S.

6. (Four Times Amended) A method for inhibiting activation of a *hedgehog-patched* pathway in a patient diagnosed with a hyperproliferative disorder, comprising administering to the patient a composition comprising a purified hedgehog antagonist in a sufficient amount to reduce the activation of the *hedgehog-patched* pathway in a cell of the patient, wherein the antagonist has a structure represented in the general formula (III), or unsaturated forms thereof and/or nor- or homo-derivatives thereof:



Formula III

wherein, as valence permits,

R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub>, and R<sub>5</sub>, represent one or more substitutions to the ring to which each is attached, for each occurrence, independently represent hydrogen, halogens, alkyls, alkenyls, alkynyls, aryls, hydroxyl, =O, =S, alkoxyl, silyloxy, amino, nitro, thiol, amines, imines, amides, phosphoryls, phosphonates, phosphines, carbonyls, carboxyls, carboxamides, anhydrides, silyls, ethers, thioethers, alkylsulfonyls, arylsulfonyls, selenoethers, ketones, aldehydes, esters, or  $-(CH_2)_m-R_8$ ;

R<sub>8</sub> represents an aryl, a cycloalkyl, a cycloalkenyl, a heterocycle, or a polycycle; and

A and B represent monocyclic or polycyclic groups;

T represents an alkyl, an aminoalkyl, a carboxyl, an ester, an amide, ether or amine linkage of 1-10 bond lengths;

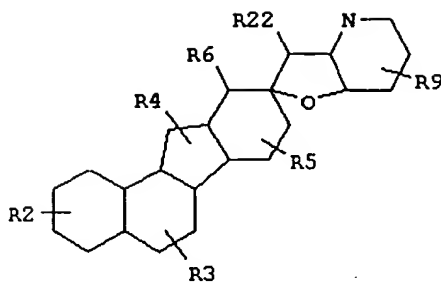
03  
bond  
T' is absent, or represents an alkyl, an aminoalkyl, a carboxyl, an ester, an amide, ether or amine linkage of 1-3 bond lengths, wherein if T and T' are present together, than T and T' taken together with the ring B form a covalently closed ring of 5-8 ring atoms;

R<sub>9</sub> represents one or more substitutions to the ring A or B, which for each occurrence, independently represent halogens, alkyls, alkenyls, alkynyls, aryls, hydroxyl, =O, =S, alkoxyl, silyloxy, amino, nitro, thiol, amines, imines, amides, phosphoryls, phosphonates, phosphines, carbonyls, carboxyls, carboxamides, anhydrides, silyls, ethers, thioethers, alkylsulfonyls, arylsulfonyls, selenoethers, ketones, aldehydes, esters, or  $-(CH_2)_m-R_8$ ; and

n and m are, independently, zero, 1 or 2;

with the proviso that A and R<sub>9</sub>, or T, T' B and R<sub>9</sub>, taken together include at least one primary or secondary amine.

7. (Four Times Amended) A method for inhibiting activation of a *hedgehog-patched* pathway in a patient diagnosed with a hyperproliferative disorder, comprising administering to the patient a composition comprising a purified hedgehog antagonist in a sufficient amount to reduce the activation of the *hedgehog-patched* pathway in a cell of the patient, wherein the antagonist has a structure represented in the general formula (IV), or unsaturated forms thereof and/or nor- or homo-derivatives thereof:



Formula IV

wherein, as valence permits,

$R_2$ ,  $R_3$ ,  $R_4$ , and  $R_5$ , represent one or more substitutions to the ring to which each is attached, for each occurrence, independently represent hydrogen, halogens, alkyls, alkenyls, alkynyls, aryls, hydroxyl, =O, =S, alkoxyl, silyloxy, amino, nitro, thiol, amines, imines, amides, phosphoryls, phosphonates, phosphines, carbonyls, carboxyls, carboxamides, anhydrides, silyls, ethers, thioethers, alkylsulfonyls, arylsulfonyls, selenoethers, ketones, aldehydes, esters, or  $-(CH_2)_m-R_8$ ;

$R_6$  is absent or represents halogens, alkyls, alkenyls, alkynyls, aryls, hydroxyl, =O, =S, alkoxyl, silyloxy, amino, nitro, thiol, amines, imines, amides, phosphoryls, phosphonates, phosphines, carbonyls, carboxyls, carboxamides, anhydrides, silyls, ethers, thioethers, alkylsulfonyls, arylsulfonyls, selenoethers, ketones, aldehydes, esters, or  $-(CH_2)_m-R_8$ ;

$R_8$  represents an aryl, a cycloalkyl, a cycloalkenyl, a heterocycle, or a polycycle;

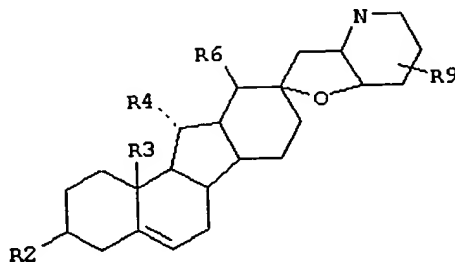
$R_9$  represents one or more substitutions to the ring A or B, which for each occurrence, independently represent halogens, alkyls, alkenyls, alkynyls, aryls, hydroxyl, =O, =S, alkoxyl, silyloxy, amino, nitro, thiol, amines, imines, amides, phosphoryls, phosphonates, phosphines, carbonyls, carboxyls, carboxamides, anhydrides, silyls, ethers, thioethers, alkylsulfonyls, arylsulfonyls, selenoethers, ketones, aldehydes, esters, or  $-(CH_2)_m-R_8$ ;

$m$  is 0, 1, or 2; and

$R_{22}$  is absent or represents an alkyl, an alkoxyl or -OH.

8. (Four Times Amended) A method for inhibiting activation of a *hedgehog-patched* pathway in a patient diagnosed with a hyperproliferative disorder, comprising administering to the patient a composition comprising a purified hedgehog antagonist in a sufficient amount to reduce the

activation of the *hedgehog-patched* pathway in a cell of the patient, wherein the antagonist has a structure represented in the general formula (V) or unsaturated forms thereof and/or nor- or homo-derivatives thereof:



Formula V

wherein, as valence permits,

03  
02  
R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub>, and R<sub>5</sub>, represent one or more substitutions to the ring to which each is attached, for each occurrence, independently represent hydrogen, halogens, alkyls, alkenyls, alkynyls, aryls, hydroxyl, =O, =S, alkoxyl, silyloxy, amino, nitro, thiol, amines, imines, amides, phosphoryls, phosphonates, phosphines, carbonyls, carboxyls, carboxamides, anhydrides, silyls, ethers, thioethers, alkylsulfonyls, arylsulfonyls, selenoethers, ketones, aldehydes, esters, or  $-(CH_2)_m-R_8$ ;

R<sub>6</sub> is absent or represents halogens, alkyls, alkenyls, alkynyls, aryls, hydroxyl, =O, =S, alkoxyl, silyloxy, amino, nitro, thiol, amines, imines, amides, phosphoryls, phosphonates, phosphines, carbonyls, carboxyls, carboxamides, anhydrides, silyls, ethers, thioethers, alkylsulfonyls, arylsulfonyls, selenoethers, ketones, aldehydes, esters, or  $-(CH_2)_m-R_8$ ;

R<sub>8</sub> represents an aryl, a cycloalkyl, a cycloalkenyl, a heterocycle, or a polycycle;

R<sub>9</sub> represents one or more substitutions to the ring A or B, which for each occurrence, independently represent halogens, alkyls, alkenyls, alkynyls, aryls, hydroxyl, =O, =S, alkoxyl, silyloxy, amino, nitro, thiol, amines, imines, amides, phosphoryls, phosphonates, phosphines, carbonyls, carboxyls, carboxamides, anhydrides, silyls, ethers, thioethers, alkylsulfonyls, arylsulfonyls, selenoethers, ketones, aldehydes, esters, or  $-(CH_2)_m-R_8$ ; and

m is 0, 1, or 2.

11. (Reiterated) The method of claim 3, 5, 6, 7, or 8, wherein the hedgehog antagonist does not substantially interfere with the biological activity of aldosterone, androstane, androstene,

androstenedione, androsterone, cholecalciferol, cholestane, cholic acid, corticosterone, cortisol, cortisol acetate, cortisone, cortisone acetate, deoxycorticosterone, digitoxigenin, ergocalciferol, ergosterol, estradiol-17- $\alpha$ , estradiol-17- $\beta$ , estriol, estrane, estrone, hydrocortisone, lanosterol, lithocholic acid, mestranol,  $\beta$ -methasone, prednisone, pregnane, pregnenolone, progesterone, spironolactone, testosterone, or triamcinolone.

12. (Reiterated) The method of claim 3, 5, 6, 7, or 8, wherein the hedgehog antagonist does not specifically bind a nuclear hormone receptor.

13. (Reiterated) The method of claim 3, 5, 6, 7, or 8, wherein the hedgehog antagonist does not specifically bind estrogen or testosterone receptors.

14. (Reiterated) The method of claim 3, 5, 6, 7, or 8, wherein the hedgehog antagonist has no estrogenic activity at therapeutic concentrations.

15. (Reiterated) The method of claim 3, 5, 6, 7, or 8, wherein the hedgehog antagonist inhibits activation of the *hedgehog-patched* pathway with an ED<sub>50</sub> of 1 mM or less.

16. (Reiterated) The method of claim 3, 5, 6, 7, or 8, wherein the hedgehog antagonist inhibits activation of the *hedgehog-patched* pathway with an ED<sub>50</sub> of 1  $\mu$ M or less.

17. (Reiterated) The method of claim 3, 5, 6, 7, or 8, wherein the hedgehog antagonist inhibits activation of the *hedgehog-patched* pathway with an ED<sub>50</sub> of 1 nM or less.

20. (Reiterated) The method of claim 3, 5, 6, 7, or 8, wherein the hedgehog antagonist is administered as part of a therapeutic or cosmetic application.

30. (Reiterated) The method of claim 3, 5, 6, 7, or 8, wherein the hyperproliferative disorder comprises basal cell carcinoma.

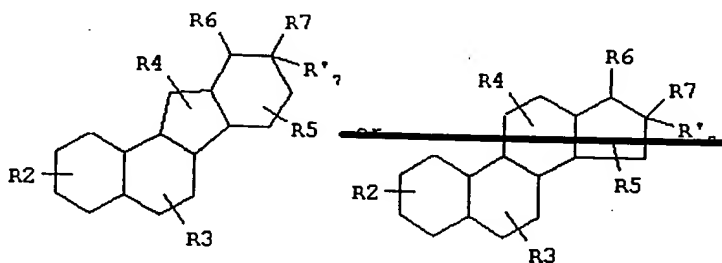
31. (Reiterated) The method of claim 3, 5, 6, 7, or 8, wherein the hyperproliferative disorder comprises medulloblastoma.

33. (Reiterated) The method of claim 3, 5, 6, 7, or 8, wherein the composition is administered topically.

44. (Reiterated) The method of claim 3, 5, 6, 7, or 8, wherein the antagonist is other than jervine.

*The claims presented above incorporate changes as indicated by the marked-up versions below.*

3. (Twice Amended) A method for inhibiting activation of a *hedgehog-patched* pathway in a patient diagnosed with a hyperproliferative disorder, comprising administering to the patient a composition ~~including~~ comprising a purified hedgehog antagonist in a sufficient amount to reduce the activation of the *hedgehog-patched* pathway in a cell of the patient, wherein the antagonist is a steroidal alkaloid having a structure represented in the general formulas (I), or unsaturated forms thereof and/or nor- or homo-derivatives thereof:



Formula I

wherein, as valence permits,

R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub>, and R<sub>5</sub>, represent one or more substitutions to the ring to which each is attached, for each occurrence, independently represent hydrogen, halogens, alkyls, alkenyls, alkynyls, aryls, hydroxyl, =O, =S, alkoxyl, silyloxy, amino, nitro, thiol, amines, imines, amides, phosphoryls, phosphonates, phosphines, carbonyls, carboxyls, carboxamides, anhydrides, silyls, ethers, thioethers, alkylsulfonyls, arylsulfonyls, selenoethers, ketones, aldehydes, esters, or -(CH<sub>2</sub>)<sub>m</sub>-R<sub>8</sub>;

R<sub>6</sub>, R<sub>7</sub>, and R'<sub>7</sub>, independently for each occurrence, are absent or represent; ~~independently;~~ hydrogens, halogens, alkyls, alkenyls, alkynyls, aryls, hydroxyl, =O, =S, alkoxyl,